

# C1 Exercise 1D (factorise with a single bracket)

$$1 \quad 4x + 8.$$

Think about it. I did one of those expand things in Exercise 1C and I got  $4x+8$  as my answer.

What could the question have been?

... well what goes into  $4x$  AND  $+8$  ?

1, 2, 4 perhaps? Ok then... the question might have been

$$(a) \quad 1(4x+8)$$

$$(b) \quad 2(2x+4)$$

or, rather more grandly:

$$(c) \quad 4(x+2)$$

This last one is the one we want.

Why? - Well it has the largest possible number outside without crazy stuff like

$$(d) \quad 8\left(\frac{1}{2}x + 1\right)$$

So factorise  $4x+8 \equiv 4(x+2)$  is the answer they want.

Don't factorise like (d) to get fractions, decimals or negative powers inside the bracket. Leave things NEAT.

C1Ex1D

2

$$6x - 24 \equiv 6(x - 4)$$

HCF of 6 and 24 is 6.

Whereas HCF of 20 and 15 is 5:

3

$$20x + 15 \equiv 5(4x + 3)$$

In each case I've found the highest common factor of the two coefficients and brought it outside a bracket. Then I ask myself: "now, what needs to be in here to get that?"

4

$$2x^2 + 4 = 2(x^2 + 2)$$

Two fits into  $2x^2$  and 4.

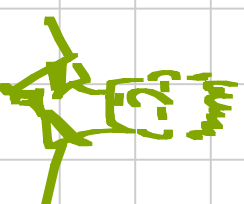
So bring the two out.

Now 2 times ...  $x^2$ , yes that gets me  $2x^2$

... and 2 times +2 gets me +4 bit.

Great so  $2(x^2 + 2)$

☺☺



C1Ex1D

5

$$4x^2 + 20 = 4(x^2 + 5)$$

4 out...

Then an  $x^2$  thingy

Now a +5 & we're done



$$6x^2 - 18x \equiv 6(x^2 - 3x) \text{ right?}$$

Er, no! You've not finished. If I asked you to simplify the fraction  $\frac{6x^2}{18x}$  and you put  $\frac{x^2}{3x}$

you'd not be finished because  $x$  still goes into both bits.

Same here:

$$6x^2 - 18x \equiv 6x(x - 3) \quad \checkmark$$

Remember, the aim is to get the highest common factor out so the  $x$  has to come too.

C1E×1D

7

$$x^2 - 7x \equiv x(x - 7)$$

$x$  fits into both dividend?

8

$$2x^2 + 4x \equiv 2x(x + 2)$$

2 fits,

$x$  fits,

$2x$  fits!



9

$$3x^2 - x \equiv x(3x - 1)$$

Some students have a hard time with the  $-1$  at the end.

You've taken  $x$  out, yes?

So what do you need to multiply  $x$  by to get the  $-x$  you started with?

$-1$ . That's right!

C1Ex1D

10

$$6x^2 - 2x \equiv 2x(3x - 1)$$

Another one the same...

C1E×1D

11

$$10y^2 - 5y = 5y(2y - 1)$$

I don't know about you, but I think I get the point about the -1 bit now.

C1Ex1D

12

$$35x^2 - 28x = 7x(5x - 4)$$

↖  
Variety - At last!

13

$$x^2 + 2x \equiv x(x+2)$$

You didn't put  $x(1x+2)$  did you?  
Oh, the shame!

C1Ex1D

14

$$3y^2 + 2y = y(3y + 2)$$

These seem to be getting easier

15

$$4x^2 + 12x \equiv 4x(x + 3)$$

16

$$5y^2 - 20y = 5y(y - 4)$$



17

$$9xy^2 + 12x^2y$$

... And things were getting so easy.

Ok. Obviously 3 fits.  $x$  fits.  $y$  fits.

$x^2$  won't fit into the first term and  $y^2$  won't fit the 2nd.

So that's it:  $3xy$ .

$$\equiv 3xy(3y + 4x)$$

need another  $y$   
to get  $y^2$

need another  $x$  to  
get the  $x^2$ .

18

$$6ab - 2ab^2 \equiv 2ab(3 - b)$$

2 fits.

a fits  
b fitsso  $2ab$  fits.

$$2ab \times 3 \equiv 6ab$$

$$2ab \times -b \equiv -2ab^2$$

so I need  $3-b$  in the bracket.

19

$$5x^2 - 25xy = 5x(x - 5y)$$

Ok, you think it through yourself. You know what to do by now.

$$20 \quad 12x^2y + 8xy^2 \equiv 4xy(3x + 2y)$$

21

$$15y - 20yz^2 = 5y(3 - 4z^2)$$

do you like the near little zed with a bar?  
It stops zed looking like two. Do yours the same.



Today's Sesame Street is brought  
to you by the letter zee!

22

$$12x^2 - 30 \equiv 6(2x^2 - 5)$$

Watch out. Highest common factor remember.

$2(6x^2 - 15)$ ,  $3(4x^2 - 10)$  etc just won't do.

23

$$xy^2 - x^2y \equiv xy(y - x)$$

they love this  $ab^2 - a^2b$  format don't they?

C1Ex1D

24

$$12y^2 - 4yx \equiv 4y(3y - x)$$

Hurrah!

